

**Toward Making the AMS Carbon Neutral:
Offsetting the Impacts of Flying to Conferences**

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Capsule Summary

Flying to AMS conferences contributes to our organization's greenhouse-gas impact.

Remote conferencing and "offsetting" this carbon footprint (taxing conference participation and investing receipts to reduce greenhouse-gases) are possible solutions.

1. Introduction

The American Meteorological Society (AMS) recently endorsed the National Academies statement on the global response to climate change (National Academies, 2005; AMS 2005). We officially recognize the high probability of global warming from anthropogenic greenhouse-gas emissions and implicitly endorse their recommendation to “take prompt action to reduce the causes of climate change.” The AMS could underline the organization’s perceived importance of reducing greenhouse-gas emissions by becoming “carbon neutral.” This would involve conservation efforts as well as the purchase of carbon offsets, taxing ourselves for continuing to pollute, while donating the receipts to organizations that will fund projects that achieve equal reductions in emissions. By committing to carbon neutrality, the AMS would lead by example. It would demonstrate that we take the consequences of global warming seriously.¹

The AMS produces a carbon footprint through many activities, including its headquarters operations at 45 Beacon St., the publishing and dissemination of journal articles, and the conduct of conferences. This last and assumedly predominant impact shall be the primary topic here. For many of us who regularly attend AMS conferences, flying to and from them produces copious greenhouse-gas emissions (of course, flying anywhere will have the same sort of impact, but let us confine the discussion to AMS activities here). To quantify this, suppose you drive 12,000 miles this year (~19312 km) in a car that averages 25 miles per gallon (~10.6 km / liter). If so, you will have produced

¹ In embracing carbon neutrality, the AMS should also indicate in a policy statement that the Society believes that national and international agreements are still preferable for achieving comprehensive greenhouse-gas emissions. Embracing carbon neutrality should not provide a disincentive for embracing more sweeping change.

greenhouse-gas effect of approximately 4.45 metric tons (1000 kg / metric ton) of carbon dioxide (CO₂) through this activity². In comparison, one round-trip ticket from Denver to Washington, DC produces approximately the greenhouse-gas effect equivalent to 1.32 metric tons of CO₂³. Multiply this effect by the more than four thousand attendees annually to AMS conferences and the magnitude of our annual contribution from air travel becomes clear⁴. As atmospheric scientists, it should discomfort us that even as strive to reduce our personal emissions, our professional work travel can reduce the impact of these efforts.

2. Why we should conserve and offset.

Aside from doing nothing, the AMS could conceivably select from among many possible ways of addressing the organizational contribution to greenhouse-gas emissions. For example, the AMS could invest in adaptive capacity, helping those affected by global warming to be able to deal with consequences such as warmer temperatures and rising sea levels. While adaptation is very likely to happen eventually, it is difficult to anticipate what countries and organizations will be most worthy of help decades or centuries hence. Adaptation also does not change the underlying problem, and not every

² This was calculated from the Environmental Protection Agency web site http://www.epa.gov/climatechange/emissions/ind_calculator.html. This assumed that 19.4 pounds of CO₂ are emitted per gallon of gasoline, and the radiative effect is calculated by multiplying the resulting total by 1.0526 to account for the effects of other tailpipe emissions.

³ There are many calculators of airline greenhouse-gas emissions available over the web. The number cited above was calculated using the “atmosfair” web site (<https://www.atmosfair.de/index.php?id=5&L=3>). A detailed description of the method for calculating emissions is available at <http://www.atmosfair.de/index.php?id=27&L=3>.

⁴ According to AMS statistics, their meetings drew 4700 people in 2005 and 4200 in 2006.

affected organism can adapt; for example, building seawalls to protect an urban coastline will not reverse the decline of the polar-bear population due to shrinking sea ice.

Alternatively, the AMS might embrace “geoengineering,” investing in ways of changing our planet so that the anticipated warming is reduced or eliminated (MacCracken 2006). Many examples of geoengineering have been proposed in the last few decades, such as increasing the earth’s albedo through the injection of sulfate aerosol precursors into the stratosphere. This would increase the planetary albedo at modest expense, resulting in less solar radiation reaching the surface (Crutzen 2006, Wigley 2006). However, there are practical reasons why geoengineering investment is not a wise short-term course of action for the AMS. Scientifically, most of the geoengineering strategies have not been adequately tested, so possible unanticipated affects and negative feedbacks are not well understood. Further, geoengineering strategies have global impact, with inevitable winners and losers, and hence such strategies cannot be utilized without international agreement (Bodansky 1996).

Mitigating our carbon footprint through conservation and offsetting the rest are much more realistic near-term strategies for the AMS. A first step would be to conserve energy. Regarding AMS conference activities, it would be helpful if some of the scientific exchange that we now do through on-site participation could be done remotely. For those who do not require the in-person interaction a conference provides, the AMS could facilitate remote participation. To encourage this, perhaps a discounted conference attendance fee would be possible for those participating remotely (perhaps the AMS could then rent smaller, less expensive venues, so conceivably this option might be

revenue neutral). Presentations could be broadcast over the internet. Questions could be e-mailed to the session chair, and perhaps a two-way audio link could be established so that questions could be asked remotely. With technology changing so rapidly, it's not difficult to imagine that a robust videoconference capability could also be established in short order. Perhaps this remote-attendance capability will also broaden the number of people who participate.

If we cannot conserve, then surely we can offset. A wide range of non-profit and for-profit organizations can perform the carbon offsets. The price of an offset varies from several dollars to several tens of dollars per metric ton of CO₂ (Table 1). Prices vary primarily due to the expense and documented efficacy of a particular type of offset; generally the less expensive offsets like planting trees are more controversial in whether they will actually produce the long-term greenhouse-gas reduction claimed. To be guaranteed effective, the AMS offsets should meet stringent criteria (Kolmuss and Howell 2006). "Additionality" must be verified, meaning that the emissions reduction would not be accomplished in the absence of the AMS funding. Further, AMS offset should not shift emissions elsewhere, and protections must be in place to avoid "double counting." For example, AMS-sponsored offsets that fund a wind-farm development in a particular state should not be counted as part of a state's legislatively mandated greenhouse-gas reductions. And last, the AMS should indicate that its own carbon neutrality is not be interpreted as a statement that efforts by individual organizations are an adequate substitute for a more wide-ranging policy.

How much would offsetting increase your conference fee? As a back-of-the-envelope calculation, let us assume that the average conference participant flies 1000 miles (~1613 km) each way. This would produce the greenhouse-gas impact of ~ 0.88 metric tons of CO₂⁵. Assuming a representative offset cost of US \$15.00 per metric ton, the carbon offset cost for the conference trip would be \$13.20. The conference fee would be increased by this amount, with the collected funds directed to a reputable carbon offset organization.

3. A discussion of objections to offsetting at the AMS.

Many objections may be raised to the idea of a mandatory AMS tax for offsetting the impact of attending a conference. Let us consider some of these objections.

First, aviation is currently estimated to be a relatively small fraction of the overall planetary contribution greenhouse-gas impact. The Intergovernmental Panel on Climate Change (IPCC) estimated the aviation contribution to be 2 percent of the total CO₂, though the overall impact may be magnified by ozone and water-vapor emissions (IPCC, 1999). If this is much smaller in aggregate than other greenhouse-gas sources, why should the AMS focus on this? The answer is that while aviation is likely to be a small component of the global problem, *for those of us who fly frequently and for the AMS as an organization, it is our predominant source.*

Another objection may be that a uniform carbon offset tax upon each conference participant is unfair, since conference participants come from both near and far, and some

⁵ Again calculated using the previously cited atmosfair calculator, for a round trip between Denver, CO and San Jose, CA, which is approximately 1000 miles each way.

drive. However, AMS conference locations change from year to year, so for most of us, if we overpay one year, we are likely to underpay the next. Over time, the costs should average out to be relatively fair.

Must offsetting our AMS-related air travel be mandatory? Unfortunately, voluntary CO₂ reduction has yet to work at the national and international scale. Also, were it voluntary, the carbon offset would have to come out of each attendee's pocket. If built into the conference fee, then the work organization that commonly pays for your conference attendance would automatically be paying that offset. A skeptic might argue that the AMS is substituting its own value judgment for that of the conference participant and the organization funding the travel, and that money should go instead could stay with the organization sending the scientist, thereby providing more funds for research. While this is a valid point, there is another way of looking at it: an offset is simply part of the cost of doing business with a certifiably responsible organization like the AMS.

Conference attendees are provided with attractive venues, effective organization, and archival of presentation materials. In the future, the raised fee would include offsets, this insurance policy that the positive benefit from attending the conference isn't negated by a greenhouse-gas impact.

4. Conclusion

For many of us frequent-flying AMS members, our personal and our professional airline travel produces our biggest personal greenhouse-gas impact. The most obvious remedy is difficult: we need to cut back on our airline travel. Perhaps we can combine work and recreational travel, or perhaps we can attend some less important conferences

remotely. Failing that, we should offset our carbon impact, taxing ourselves and investing the proceeds in projects such as renewable energy. Consequently, I urge the AMS to invest in a remote-conference infrastructure and to build the modest cost of carbon offsetting into their conference fees. This action is consistent with our endorsement of the National Academies' recommendation for prompt action on climate change. Our leadership on this issue will lend credibility to the scientific guidance we offer our government.

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Table 1: A partial list of carbon offset providers, the cost of the carbon offset they provide, and the types of projects the funds are used for. Taken in April, 2007 from http://www.ecobusinesslinks.com/carbon_offset_wind_credits_carbon_reduction.htm .

Carbon Offset Provider	Price (US\$ per Metric ton CO2)	Project Types
AtmosClear Climate Club	\$3.56-\$25.00	Methane capture from landfill
Carbonfund.org	\$4.30-\$5.50	Renewables, efficiency, reforestation
e-BlueHorizons	\$5.00	Renewables, reforestation
Terrapass	\$7.35-\$11.00	Renewables, efficiency
DriveNeutral.org	\$6.93 and up	Efficiency
DrivingGreen	\$8.00	Renewables
Solar Electric Light Fund	\$10.00	Renewables
Native Energy	\$13.20	Renewables
The CarbonNeutral Company	\$14.00-\$18.00	Renewables, efficiency, reforestation, methane
Climate Friendly	\$16.00-\$19.00	Renewables
Uncook the Planet	\$19.45	Efficiency
Sustainable Travel International	\$18.00	Renewables
Bonneville Environmental Foundation	\$29.00	Renewables
Myclimate	\$53.00	Renewables
Global Cool	\$39.48	Renewables, efficiency